

PATHWAYS

VOL. XI

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No. 2

A STUDY OF SNAILS

Activity 1 : Keeping Snails

Materials

Per Group :

- Snail
- Small aquarium or large jar with mesh cover
- Moist humus
- Withered leaves
- Rotted wood

Objectives

Children :

- * Find and collect land or freshwater snails
- * Construct a habitat for the snails
- * Duplicate the conditions necessary to support the living snails

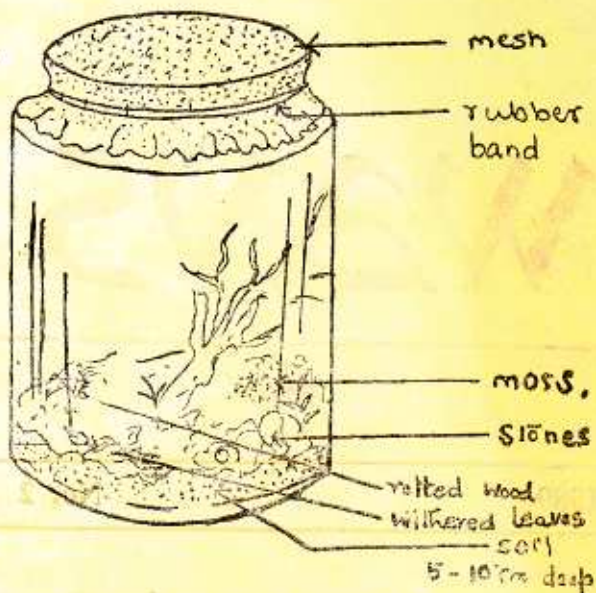
Procedure

- * The children could find land or pond snails as common examples of gastropods to keep in the classroom
- * Have the children record where they found

their snails. Damp, leafy places like gardens, hedges or ponds are good places to find snails.

- * The children should try to reproduce this habitat in the aquarium or large jar by using materials collected from the habitat. Each average sized snail requires about 500 cm³ (a half a litre jar) of space in which to live. The aquarium or jar should be kept out of direct sunlight.
- * Land snails can be kept in a terrarium built as shown in the diagram. The terrarium should be sprayed lightly with water each afternoon, and cleaned out once a week.
- * Land snails will feed on lettuce, spinach, raw potatoes, carrots, tomatoes and ripe fruit.
- * Freshwater snails can be kept in an aquarium. The aquarium should not need cleaning as the snails will keep the glass clean by feeding on algae and pondweed.

A TERRARIUM



Activity 2 : Characteristics of Snails (A)

Materials

Per Group :

Garden snail

Sheet of transparent glass or Perspex

Sheet of cardboard (approximately 30cm × 15cm)

Magnifying glass

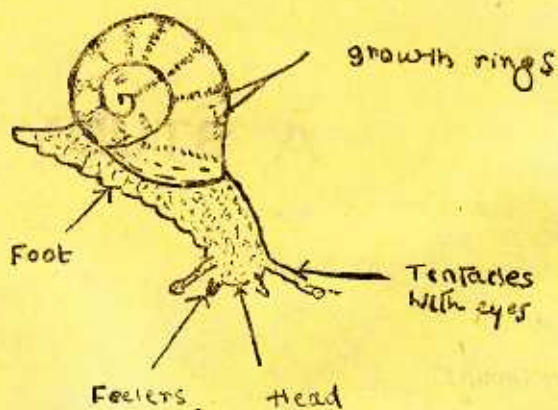
Objectives

Children :

- * Observe the external appearance of a snail
- * Test the reaction of the snail to touch
- * Observe and describe the behaviour of a snail's foot as it moves
- * Measure the speed of a snail
- * Observe the mouthparts of a snail as it eats
- * Observe the way in which a snail breathes
- * Draw up a chart of quantitative data about each snail

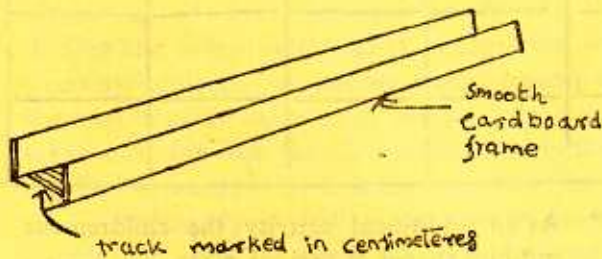
Procedure

- * Have the children transfer their snail to a sheet of glass. Ask them to list what they can observe about the snail. They should include :
 - a coiled shell, usually coiled to the right; a shell coiled to the left is most unusual in common species.
 - A flat, moist body (foot) under the shell.
 - a head at the front end of the foot.
 - Two large tentacles with eyes like knobs.
 - two small tentacles which act like feelers,
 - a trail of slime behind the snail.



- * Tell the children to gently touch the long tentacles and observe what happens. They should see the tentacles retract. They could also touch the smaller tentacles.
- * Have the children obstruct the forward movement of the snail and observe its reactions.
- * The children could also observe the movement of the snail from beneath the sheet of glass. Ask them to describe the movement of the foot. They should see 'waves' as the muscles of the foot contract and relax.
- * Ask the children to explain how the snail moves. They should infer that movement

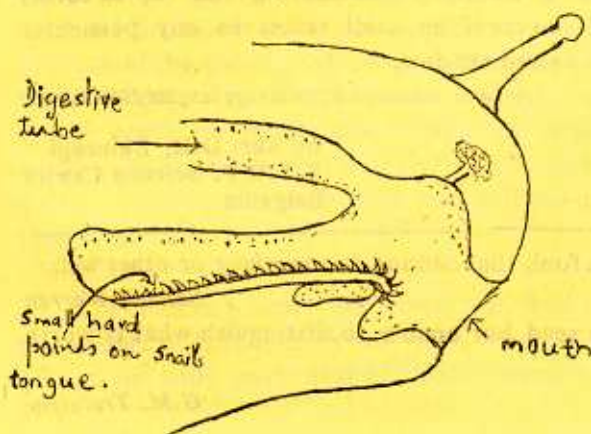
is carried out by the contracting and relaxing of the muscles in the foot. They may also infer that the slimy substance produced by the snail assists in the movement of the foot as it glides over surfaces. Have the children devise a track on which to measure the speed of their snail.



- * They should time the snail for five minutes (or as long as it will move forward voluntarily) and calculate how far this would be in one hour. Most snails could travel about 50 cm in an hour if they moved constantly. The children could check the Guinness Book of Records to find the speed of the fastest land snail.

Activity 3 : Characteristics of Snails (B)

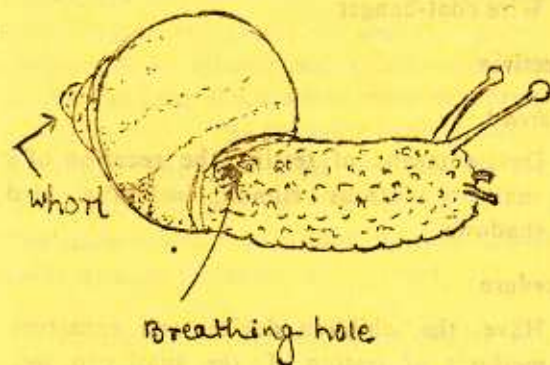
- * The children should be able to observe the snail's mouth—a small hole just below its sensory tentacles. Have them place the snail on a green leaf (e.g. lettuce) to observe how it eats. The children should be able to see the snail hold the leaf in the mouth. The leaf is ground down by small hard points on the snail's tongue.



- * To see the snail's tongue working it is best to place the snail on moist algae that has grown on a glass surface (aquarium or clear glass vase). As the snail eats, it should be possible to see the tongue moving over the algae. A magnifying glass would be useful for this observation.

Activity 4 : Characteristics of Snails (C)

- * After observing the snail for some time, children should notice that it regularly exposes an opening just under its shell on the same side as the whorl of the coil. This is the snail's breathing hole. The snail draws air into its lung through the breathing hole by exposing it with a regular raising of its shell.



- * The children could time how often the hole opens. They could compare this with the number of times humans take in air over a similar time period.
- * The children may like to draw up a table comparing the data relating to each snail.

Quantitative Data	Snail A	Snail B	Snail C	Snail D	Snail E	Snail F
Length						
Shell width						
Speed (cm/hr)						
Breathing (breaths/min)						

Activity 5 : Reaction to Stimuli

Materials

Per Class :

Desk lamp
adhesive tape (1 roll)

Per Group :

Garden snail
Sheet of cardboard
Wire coat-hanger

Objectives

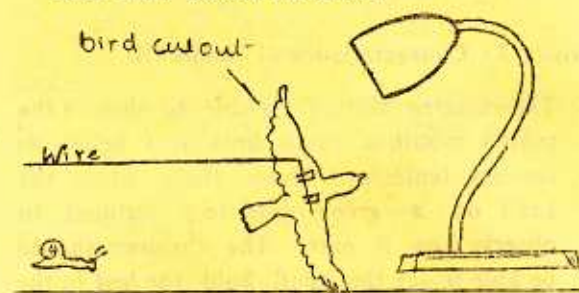
Children :

- * Devise means of testing the reaction of a snail to various stimuli, including bird shadows

Procedure

- * Have the children devise and construct methods of testing if the snail can see, feel differences in temperature; smell; react to light, distinguish between foods.

- * As an additional activity the children cut out bird shapes of various sizes. Place the snail on a surface directly below a source of light. Be careful of the temperature under the light, as the snail will retreat into its shell if it becomes too hot. Have the children tape the smallest bird cutout to the wire coat-hanger and sweep it over the snail so that the shadow of the bird 'flies' across the snail.



- * The children could repeat this process using bird cutouts of increasing size (up to 20cm) to see if the snail reacts to any particular sized shadow.

—To be continued in *Pathways* August 1989 Issue.

by Shri D.R. Baluragi
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There is probably no man living, though ever so great a fool, that cannot do *something* or other well.

Samuel Warren

Education ... has produced a vast population able to read but unable to distinguish what is worth reading. (English Social History, Ch. 18)

G.M. Trevelyan

T O M B O L A

The game of Tombola (also known as Housie or Lotto), usually played by adults, can be adapted in a variety of ways for use in a classroom. It will essentially be of use in drilling and in testing the quick recognition of items by students. A teacher could prepare a large set of cards where each child in the class takes one and the teacher herself calls out the numbers or words to be ticked off on the child's card. Alternately, students could work in small groups of six or eight where one leads the game. This could be one way of occupying those few minutes at the end of a period when there is not enough time to start something new; the children having finished their allotted quota of work are inclined to be restless. It would add interest and perhaps prove an incentive to the learning of multiplication tables, spellings and so on.

Some variations are described below, which could be used in language and mathematics. An imaginative teacher could find many other ways of using this game.

Let us start with mathematics. Suppose we wish to get the children to practise the four times table $4 \times 1 = 4$ $4 \times 2 = 8$... and so on up to $4 \times 12 = 48$. These twelve products can be written in a number of combinations on small cards to be given to the children—one per child. Each card is divided into six or nine compartments and one of the above products is written in each compartment. The teacher's set consists of twelve cards on which are written, in large, easily visible numbers 4×1 ; 4×2 ; 4×3 ...up to 4×12 . Note that the answer is not written on these flash cards.

The children's cards are given out, and as the teacher or leader holds up each card from his set, the child marks that particular answer on

his card. If the cards are to be re-used, they could be made out of stiff card-board and sealed inside polythene bags. Children could use buttons or other markers to avoid making pencil marks on their cards. You might wonder how using just 12 numbers 4, 8, 12..... to 48 a large number of different cards can be prepared. Consult your senior colleagues in the mathematics department and you will find out that twelve numbers taken six at a time can lead to as many as nine hundred and twenty four combinations !

Similar sets could be prepared to test a number of multiplication tables; or choosing specific number combinations like 2×9 ; 3×5 ; 4×6 ; ... taking care that an answer does not occur more than once.

The idea could also be adapted to addition, subtraction and division. Simple conversions in units: from kilometres to metres, metres to centimetres or millimetres; money and units of weight can form the basis of other sets prepared by the teacher. The teachers' cards would now carry questions like : 5 km = — m; 5 m 23 cm = — cm; Rs. 5.89 = — p; 23 kg = — gm. The answers would be written on the children's cards without the units.

Further variations for higher classes in the primary school could involve mental arithmetic—simple sums on ratio and proportion, addition of fractions.

One more idea: Simple fractions like $\frac{1}{4}$; $\frac{1}{2}$; $\frac{3}{4}$; $\frac{2}{5}$; $\frac{3}{5}$; $\frac{4}{5}$ and so on could be written on the children's cards. The teacher could hold up cards where a circle is drawn, divided into a number of equal parts and an appropriate fraction of the circle shaded in a bright colour. This will also help to fix in the children's mind

(Contd. on page 8)

Practical Science Experiences for Primary Classes

Teachers often feel that it is difficult to involve children of the primary schools in science "experiments". This may be true with respect to the formal kind of "practical" that they will be required to carry out in the senior classes. However, the syllabus taught in the primary years lends itself easily to several, simple improvised "experiments", many of which can be carried out by the children themselves-individually or in small groups. The teacher's role would be to guide them, to help them select suitable materials, to talk about controlling the conditions and to ask questions that provoke "thinking". Certainly the teacher is not there to supply all the "correct answers"! In fact, in many cases observations may not lead to answers—they may lead to more questions, followed by attempts at obtaining more information. From where? How reliable will it be? Who is a good person to ask? Can the "experiment" itself be modified? Such developments are most desirable—leading as they do towards the attainment of scientific curiosity and attitudes.

Here are some suggestions.

1. **Germination of Seeds** — Observe variations caused changing factors like light, moisture, type of soil. Why does it sometimes happen that two seeds sown on same day, under similar conditions, germinate at different times? Grow more quickly or slowly? Discuss possible reasons (quality of seed ?)

Explore what happens if containers of different materials are used — plastic, glass, tin, mud pots etc.

Record in pictures and tabular form.

Note : There may not be any definite rules/conclusions at the end of such an experiment.

2. **Measurements** : length, mass, capacity time

- * Use non-standard units (handspan, pace etc) — will all get some result? Why?

- * Use standard units

- * Make your own measuring devices—ruler/tape, graduated bottle, timer, (sand filled in inverted injection vial allowed to trickle through to another vial) balance etc.

Improvise 'weights' using sand bags.

Children need to develop *practical* concepts of units used.

3. **Balanced Diet** : Children can make up their own menus or select a menu from pictures pasted on cards. These should then be analysed to see if all types of foods are represented. Classification may be in broad terms like energy - giving foods, food which help us grow, foods which keep us healthy. Don't forget the role of roughage and water! Obviously individual items must be considered in terms of their main ingredients only. All cooked food is likely to contain some salt, spices and oil.
4. **Teeth** : Count and record (in pictures or numbers) your own set. Learn to brush teeth correctly.
5. **Make An Insect Observation Box** : Use a hot knife to cut a circle of suitable size out of the lid of a plastic ice cream cup. Fix an inexpensive hand lens (costs about Re. 1/- only, often given with biology dissection kits, can be bought in some toy shops) in the lid, using candle wax to hold it in place. Insect or small animal placed inside is seen enlarged. Its features can be observed.

- Observe ants, beetles, cockroaches, millipedes, bees, houseflies etc. Caution children against picking them up with their hands; they may get stung or bitten. Don't forget to punch a few small air holes in the side and *do release the captive animal/insect soon, preferably in the place where it was picked up.*
6. Keep earthworms/ants in large plastic jars containing soil. Remember earthworms need moisture so water the soil lightly but often. Add food for them too. Find out what they eat.
 7. **Make Leaf Prints :** Place leaf face down on table. Place thin paper on top of leaf and rub a crayon over it to obtain a *print*. Shape of leaf, edges and veins can be observed. Try in several colours. Assemble into patterns and/or a collage. Use leaf prints to obtain patterns through a process of repetition, through alternation, through rotation and by combining two of these processes.
 8. Draw/trace out bird shapes on slightly thick paper. Colour them correctly. Use broomsticks and sewing thread to assemble cut-out into a mobile. This helps in identifying common birds. Making the mobile is an exercise in *balancing*. Each section is a lever—link with the chapter on simple machines.
 9. Make a rain gauge using a funnel placed in mouth of bottle. Why should the funnel be as wide as the base of the bottle? Paste a graduated strip of paper along the side of the bottle. Bar graphs may be obtained using strips of paper whose length equals the depth of water collected in the bottle.
Maintain records for a month and draw conclusions.
 10. Maintain a pictorial weather chart-using different symbols like these.
Take observations at *fixed time* about four times a day.



(Contd. on page 8)

Happiness ain't a thing in itself - it's only a *contrast* with something that ain't pleasant.

Mark Twain

The more intelligent a man is, the more originality he discovers in men. Ordinary people see no difference between men.

Blaise Pascal

As good almost kill a man as kill a good book: who kills a man kills a reasonable creature, God's image; but he who destroys a good book kills reason itself.

John Milton

11. Similarly cyclostyle a sheet of 28 squares about 4 cm × 4 cm with dotted circles drawn inside. Let children observe the moon daily at a fixed time and draw its shape. They could shade lightly the portion of the circle that is dark. What changes are seen? Remind them to put the date and time on observations.
12. Observation Exercises — pictorial / written records can be kept.
- * plants in the neighbourhood
 - * animals in the neighbourhood
- (Remind them to look for the small ones they usually forget! And only put down what they *actually see*.)
- * living and non-living things
 - * textures/shapes/colours/sound
 - * play a game of "I Spy" to make these exercises more fun. e.g. I spy objects whose names begin with the letter.....
- I spy objects which are green
- I spy round objects etc.
- * Observation exercises with common objects
- e.g. a pencil
- a burning candle
- a collection of bottles each having one glass of water poured in

How many sentences can they write about them in 3 minutes?

* Floating and Sinking — common objects

13. Classification Exercises

e.g. leaves (colour, size, tip, texture thickness, venation etc.)

fruits, cloth samples, paper of different kinds, people who help us, materials etc.

14. Play games of different kinds to reinforce and check facts :

- a) Bingo, Housey or Tombola (See page 5)
- b) Word squares/puzzles
- c) Quizzes
- d) I spy (See no. 12 above)

15. Involve children in making colourful, large poster/collages on themes like.

Cleanliness	Pollution
Good Health	Looking after Trees

Ask for original work, not cutting and pasting of pictures. Encourage the children to put in an element of humour — fun, jokes, funny ideas and so on — let their imagination run riot you'll be surprised at the results !

(Contd. from page 5)

the physical idea of such fractions. Equivalent fractions might also be tried out.

Starting with language drilling for the very young, the teacher could hold up large pictures of various objects and the children could mark on their cards the letter with which the object's name begins. This could be done for capitals as well as lower case letters, and is merely an extension of the 'A is for Apple' idea.

As a next step the letters on the children's cards could be replaced by words, specially chosen from their limited vocabulary. This provides a way of checking on word recognition

and spellings. Perhaps it might also be possible to match a picture held up by the teacher with its partner on the child's card. This would need careful planning to find easily identifiable pairs like bat and ball; cup and saucer; bucket and mug and so on. Depending on the age level of the class, the teacher might find it easier to write words instead of drawing pictures, or use a one-word to one-picture combination.

We would be happy to have from our readers, suggestions for other learning games which could be tried out in class.

Gayatri Moorthy

(Reprinted from PATHWAYS, April 1980 Issue)

All Play Maketh Jack a Bright Child

It is sad to note that our primary school curricula do not emphasise play as a medium for learning. This vital element of play needs to be included in our curricula to make learning a joyful activity for children. When rightly used, play can effectively foster children's cognitive, social and physical development. All of us know that children are playful and curious by nature, and integrating learning with play will make school experiences more meaningful for them.

Play as a learning medium has many advantages. First of all, it can work as a valve for releasing the surplus physical energy of the child. Secondly, it can provide children opportunities to express their emotions and feelings freely. Third it can help the child in developing his creativity by providing a non-evaluative environment. Further, play can effectively develop certain aspects of formal learning like the concept of size, shape and numbers, along with developing the language of the child.

An educator has rightly said, "Play is the child's therapy. It is his safety valve for the release of excess emotions such as frustration, tension, anxiety, fear, due to rules and regulations that are imposed on him mainly by adults." Therefore, it would be a wise step on the part of a primary teacher to make use of play activities for inducing learning among his students. It is only through play-way methods that the total development of children is possible.

There are some commercially produced educational games available for use by children. But these games make learning formal and straight jacketed, as they lack the element of free-wheeling. Moreover, the cost factor is another aspect which inhibits introduction of

such games in most of our primary and pre-primary schools. And there is a solution to it. There are some common materials—inexpensive and easily available—like water, sand, pebbles, marbles, rocks, clay and paper, which children can play with while learning too. Many activities can be organised around these materials, making learning real fun for children.

Children are basically very curious and open minded persons. They love to explore and extend their competencies. In order to provide such opportunities, the teacher has to play a pivotal role. She/he has to provide an environment conducive to play-way activities. Along with the students, the teacher should collect all kinds of discarded household objects for the students to play with and explore. The main role of the teacher is to ensure a proper organisation of time and materials so as to engage children in pleasurable and creative play. Not only must the teacher monitor the play activities of the students, but these should also be channelled and directed so that the whole exercise becomes a joyful experience.

Play, thus, is essential for the all-round development of primary school students. If play activities are properly integrated into our primary level curricula, they can result in fuller mental, physical and emotional development of children. An enthusiastic primary teacher can change the old maxim to 'all play maketh Jack a bright child'.

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Bhatinda

* * *

COLOUR

Projects help make children more observant and creative. They also serve to strengthen their knowledge and to inculcate a scientific attitude. Simple project work can be started right from the lower primary classes. It should involve children in activities which are fun, interesting and educative.

In class I, I tried out a project on 'Colours'. We see colour all around us. The gifts of Nature—flowers, trees, birds, butterflies, the sky and clouds—would hold no appeal, if they lacked colour! I felt it was necessary to get my students acquainted with the wide range of colours around them.

Some of the activities my class tried out are described here.

1. **Recognition of Colour and their Shades:** I asked the students to wear dresses of different colours. Each one was asked to recognise the colour worn and name it. Thus the entire class got to identify not only green, blue, yellow, orange, pink but found that each colour existed in many shades, both light and dark.

We played a game outdoors. As the children ran around, I called out the name of a colour. The children were required to locate and touch an object of that colour, within a limited time. Those who could not were declared "out" and the game continued till only one student was left.

2. **Using Colours:** I asked students to paste glazed paper of different colours on the covers of their notebooks. Thus Maths books were labelled green, blue identified English, Science was red and so on. This helped students in finding their books quickly in each teaching period.

Cut-outs of different shapes were put up on the board. The students sorted and classified them according to their colours, putting different shapes of the same colour together.

The national flag was drawn and coloured and the arrangement of its three coloured bands was learnt.

Using a variety of paints and crayons, the students explored the possibilities of mixing colours. The use of white to tone down the stronger colours was also experimented with. Red plus white gave us pink. Is pink a different colour or a shade of red?

Likewise colours of objects varied when viewed through coloured cellophane paper. We explored what happens when two or more colours of cellophane are combined.

3. **Fun with Colours:** As an extension of the last activity mentioned, the students made spectacles for themselves using coloured cellophane paper.

A disc with different colours painted on it was made. We tried to find out what happens when it was spun or rotated. What happens if the colours or paints are light? dark? What happens if you use crayons? poster paints?

Drawings of many kinds were an obvious way of using colours to have fun. Children observed and drew coloured objects seen around them, a set of objects of the same colour, the beauties of nature—trees, mountains, rivers, rainbows, the sun.....their own and others' dresses...

The possibilities were endless—but I stopped with a limited number of activities, before the children lost interesthappy that they had become more aware of the wonderful world of colours.

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Language Fun

What's the T-Word ?

Every word in this list begins with a 'T'. Read the clues and find out how many you know.

1. Slope or cause to slope.
2. Principle or belief.
3. Small tower.
4. Dense growth of small trees.
5. Part of a church at right angles to nave.
6. Carry people or goods from one place, to another.
7. Transfer of organ or tissue.
8. Letting light pass through.
9. Going beyond ordinary limits.
10. Letting some light through.
11. Written or recorded copy.
12. Not permanent.
13. Natural body covering.
14. Neptune's spear.
15. Object to aim at.
16. Understood / implied.
17. Passage of scripture used for sermon.

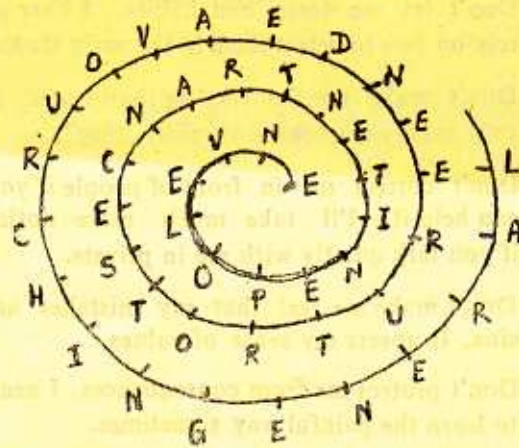
Word Spiral

You might like to ask your students to make up their own spiral like this one.

Start at the innermost point and read the overlapping words. In this example they begin like this :

ENVELOPE, BLOPE, LOPE, OPEN, PEN, PENITENT, TENT.....GENERAL

How many did you find ?



(Answers on page 12)

Imaginative Ideas

Talk about them picturize them..... write about them.

Personal Involvement

How would you feel if you were

- * an old pair of jogging shoes ?
- * a heart beat ?
- * a hungry stomach ?
- * the eraser on a pencil ?
- * a lung of a chain smoker ?
- * a dish cloth ?
- * a piece of driftwood ?

Diversity of Viewpoints

Describe

- * How would a grasshopper look to a bird? an ant?
- * How would you look to an elephant ? an ant ?

- * How would a tree look to a worm? the grass underneath it?
- * How would your mouth look to the telephone? to a spoonful of potatoes ?
- * How would a passenger plane look to a person who died a hundred years ago ?

Reorganisation

Tell what would happen if

- * Your eyeballs were on your fingers ?
- * you were one inch tall ?
- * all the circles in the world were replaced by squares?
- * everyone looked alike?
- * we didn't have any books?

Saroja Sundararajan

MEMO

From : A Child

To : Parents (Teachers please notice, too.)

1. Don't spoil me I know quite well that I ought not to have all I ask for — I'm only testing you.
2. Don't be afraid to be firm with me. I prefer it; it makes me feel secure.
3. Don't let me form bad habits. I have to rely on you to detect them in the early stages.
4. Don't make me feel smaller than I am. It only makes me behave stupidly "big".
5. Don't correct me in front of people if you can help it. I'll take much more notice if you talk quietly with me in private.
6. Don't make me feel that my mistakes are sins. It upsets my sense of values.
7. Don't protect me from consequences. I need to learn the painful way sometimes.
8. Don't be too upset when I say "I hate you". Sometimes it isn't you I hate but your power to thwart me.
9. Don't take too much notice of my small ailments. Sometimes they get me the attention I need.
10. Don't nag. If you do, I shall have to protect myself by appearing deaf.
11. Don't forget that I cannot explain myself as well as I should like. That is why I am not always accurate.
12. Don't put me off when I ask questions. If you do, you will find that I stop asking and seek my information elsewhere.
13. Don't be inconsistent. That completely confuses me and makes me lose faith in you.
14. Don't tell me my fears are silly. They are terribly real and you can do much to reassure me if you try to understand.
15. Don't ever suggest that you are perfect or infallible. It gives me too great a shock when I discover that you are neither.
16. Don't ever think that it is beneath your dignity to apologize to me. An honest apology makes me feel surprisingly warm toward you.
17. Don't forget I love experimenting. I could not get along without it, so please put up with it.
18. Don't forget how quickly I am growing up. It must be very difficult for you to keep pace with me, but please try.
19. Don't forget that I don't thrive without lots of love and understanding, but I don't need to tell you, do I?
20. Please keep yourself fit and healthy. I need you.

(Author unknown)

Answers to :

What's the T-Word ?

1. Tilt, 2. Tenet, 3. Turret, 4. Thicket,
5. Transept, 6. Transport, 7. Transplant,
8. Transparent, 9. Transcend 10. Translucent,

11. Transcript, 12. Temporary, 13. Tegument
14. Trident 15. Target, 16. Tacit, 17. Text.

Word Spiral

Envelope, clope, lope, open, pen, penitent,
tent, entrance, trance, ancestor, tort, tureen, end,
endeavour, our, urchin, hinge, gene, general.

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